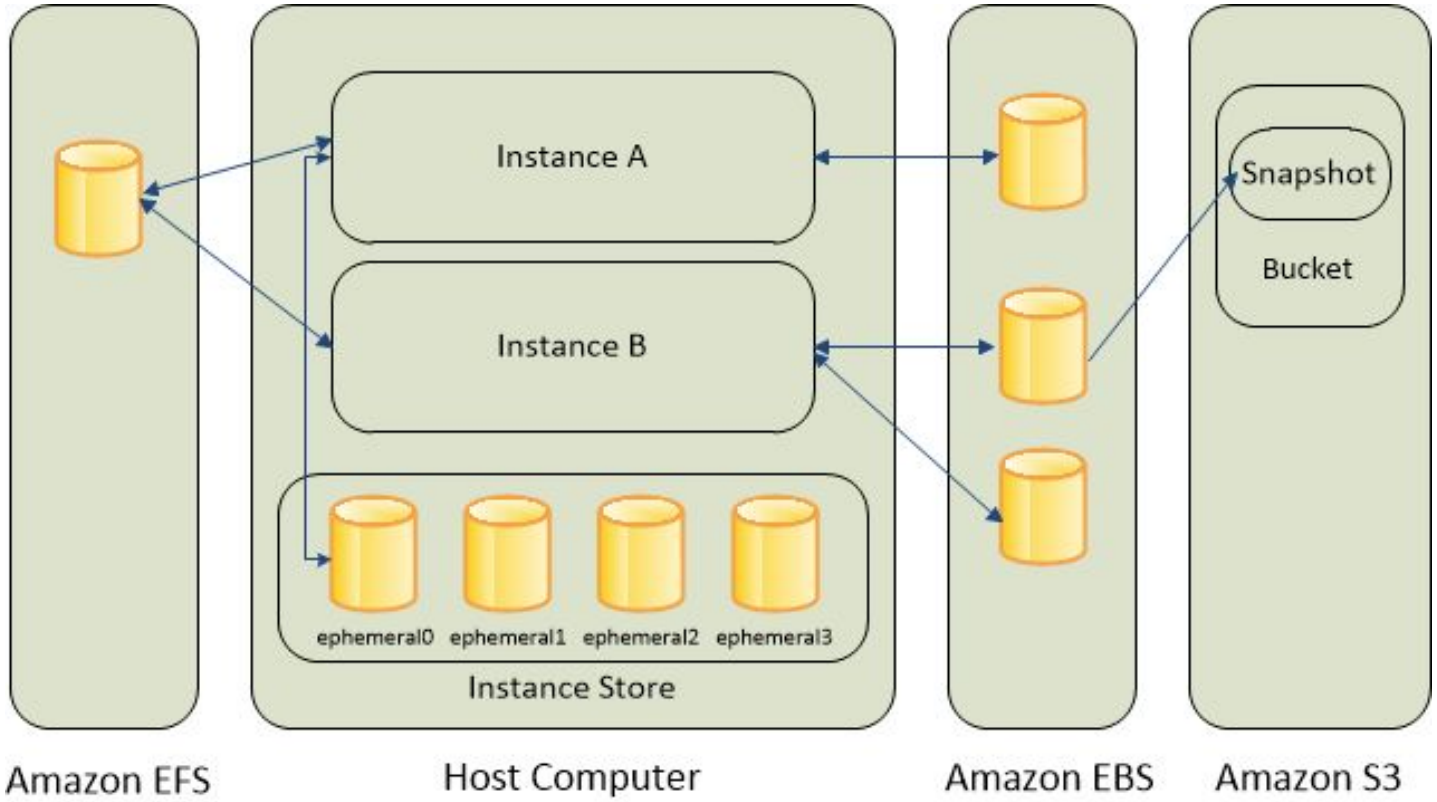
AWS EC2 Volumes

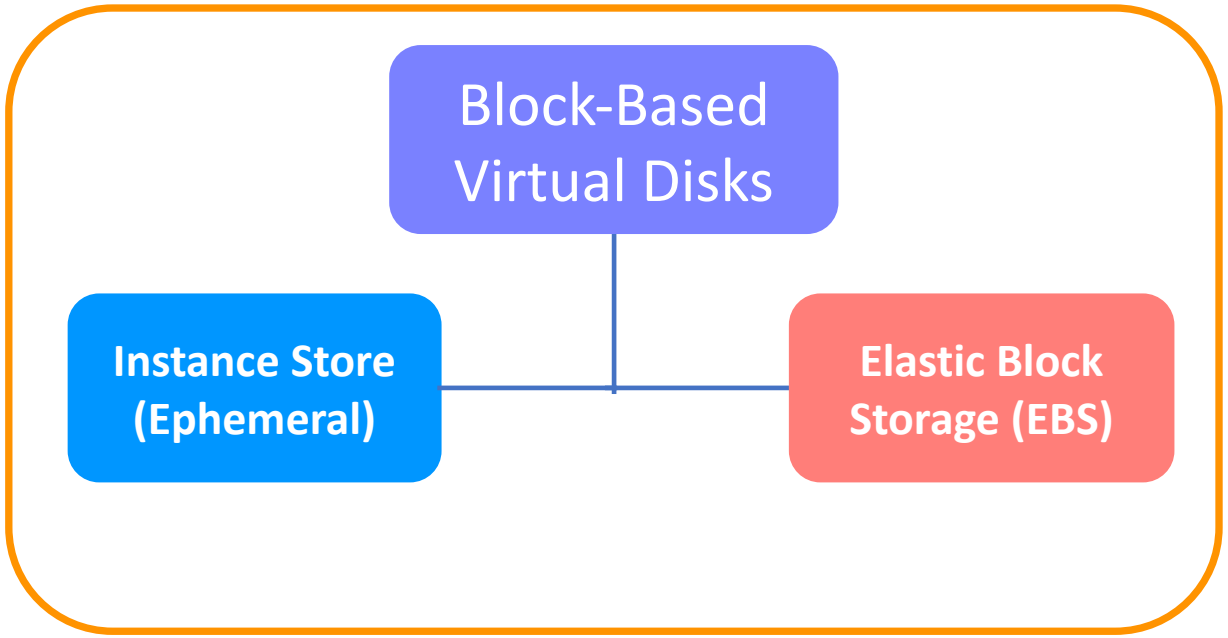
EC2 Volumes



- Block-based Storage: Instance Store and Elastic Block Store (EBS)
- Object-based Storage: Simple Storage Service (S3)
- File-based Storage: Elastic File System (EFS)

EC2 Volumes

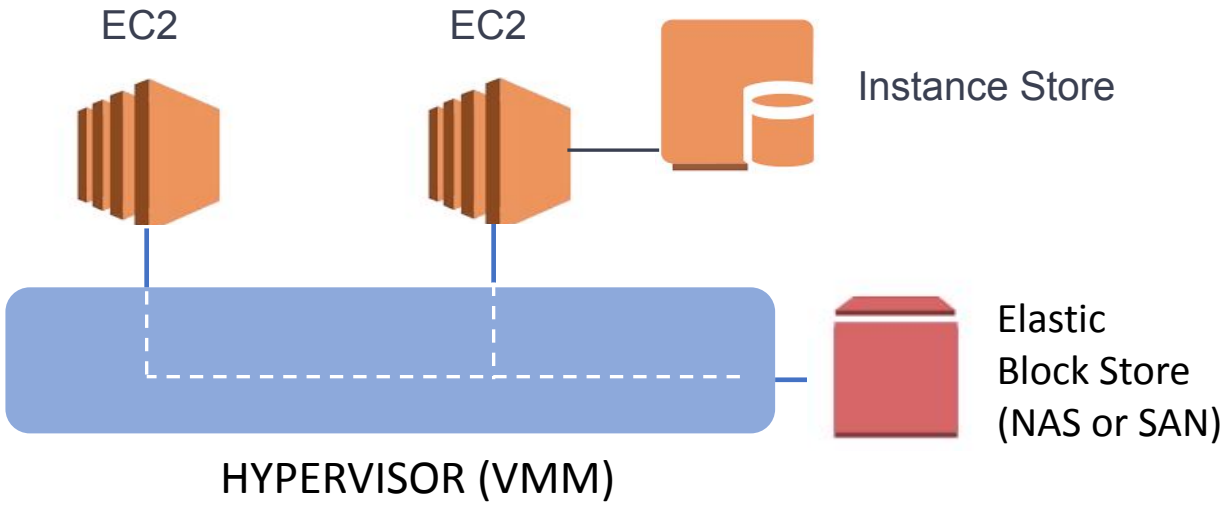
What is Volumes?



- Volumes are durable storage devices (virtual) that can be attached to EC2 instances.
- They are location in which the associated machine stores its data or loads its applications.
- There are two volume types in the block storage category. These are Instance Store (Ephemeral) and Elastic Block Store (EBS).

EC2 Volumes

Instance Store and Elastic Block Store



- Instance Store is located on disks that are physically attached to the host computer.
- Elastic Block Store is connected to the hypervisor and accessible to each machine associated with the hypervisor.

EC2 Volumes

Instance Store

- You can specify instance store for an instance only when you launch it.
- The data in an instance store persists only during the lifetime of its associated instance.
- Data in the instance store is lost under any of the following circumstances:
  -The underlying disk drive fails
  - The instance stops
  - The instance hibernates
  - The instance terminates

EC2 Volumes

Elastic Block Store (EBS)

- EBS volumes are flexible.
- EBS volumes persist independently from the running life of an EC2 instance.
- You can attach multiple EBS volumes to a single instance. The volume and instance must be in the same Availability Zone.
- You can use Multi-Attach to mount a volume to multiple instances at the same time.(Considerations and limitations)

EC2 Volumes

Elastic Block Store (EBS)

- **Location**: EBS volumes will always be in the same **AZ** as **EC2 instance** to which it is attached.
- **Resizing** : You can resize EBS volumes on the fly. You do not need to stop or restart the instance. However, you will need to extend the filesystem in the OS so the OS can see the resized volume.
- **Volume Type** : Switch volume types. You can change volume types on the fly. (e.g., go from gp2 to io2.) you don’t need to stop or restart the instance.

EC2 Volumes

Instance Store (Ephemeral) vs. Elastic Block Store (EBS)

- Instance store volumes are sometimes called **ephemeral storage.**

- Instance store volumes **cannot be stopped**. If the underlying host fails, you will lose your data.
- EBS-backed instances **can be stopped**. You will not lose the data on this instance if it is stopped.
- You **can reboot** both EBS and instance store volumes and you **will not lose** your data.
- By default, both root volumes **will be deleted** on termination. However, with EBS volumes, you can tell AWS to keep the root device volume.

EC2 Volumes

Instance Store (Ephemeral) vs. Elastic Block Store (EBS)

EC2 INSTANCE STORE

- Direct connect to one instance
- Non-persistent data storage
- No replication
- Snapshots are not available
- Both SSD and HDD Backed

ELASTIC BLOCK STORE

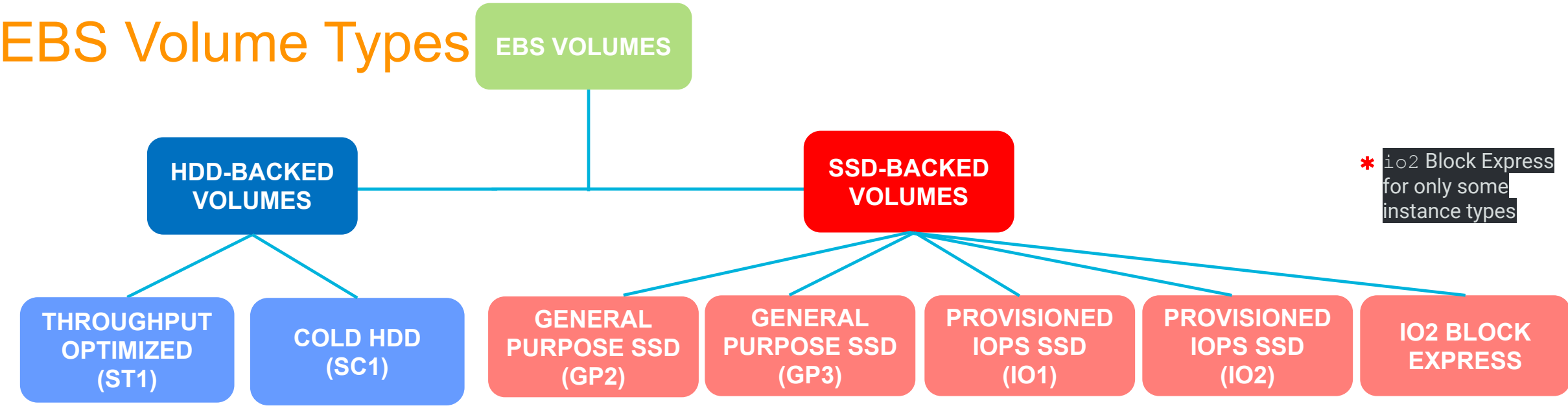
- Connect to different instances
- Persistent data storage
- Replicates data in the same AZ
- Snapshots are available
- Both SSD and HDD Backed

Hard Disk Drive (HDD)

Solid State Drive (SSD)

EC2 Volumes

EBS Volume Types



- There are 7 types of volumes in 2 categories for the different use cases.
- HDD-backed volumes are used for large streaming workloads where throughput is a better performance measure than IOPS.
- SSD-backed volumes are used for frequent read/write operations where the dominant performance attribute is IOPS.

IOPS	Throughput
• Measures the number of read and write operations per second • important metric for quick transaction, low-latency apps, transactional workloads • The ability to action reads and writes very quickly • Choose Provisioned IOPS SSD (io1 or io2)	• Measures the number of bits read and written per second (MB/s) • important metric for large datasets, large I/O sizes, complex queries • The ability to deal with large datasets • Choose Throughput Optimized HDD (st1)

Input/Output Operations per Second (IOPS)

Measure of how fast we can read and write to a device

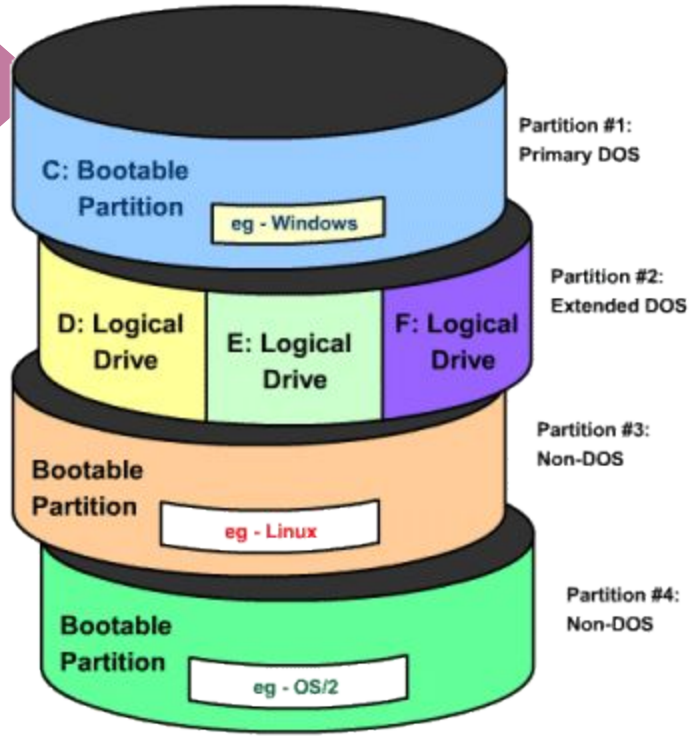
Throughput

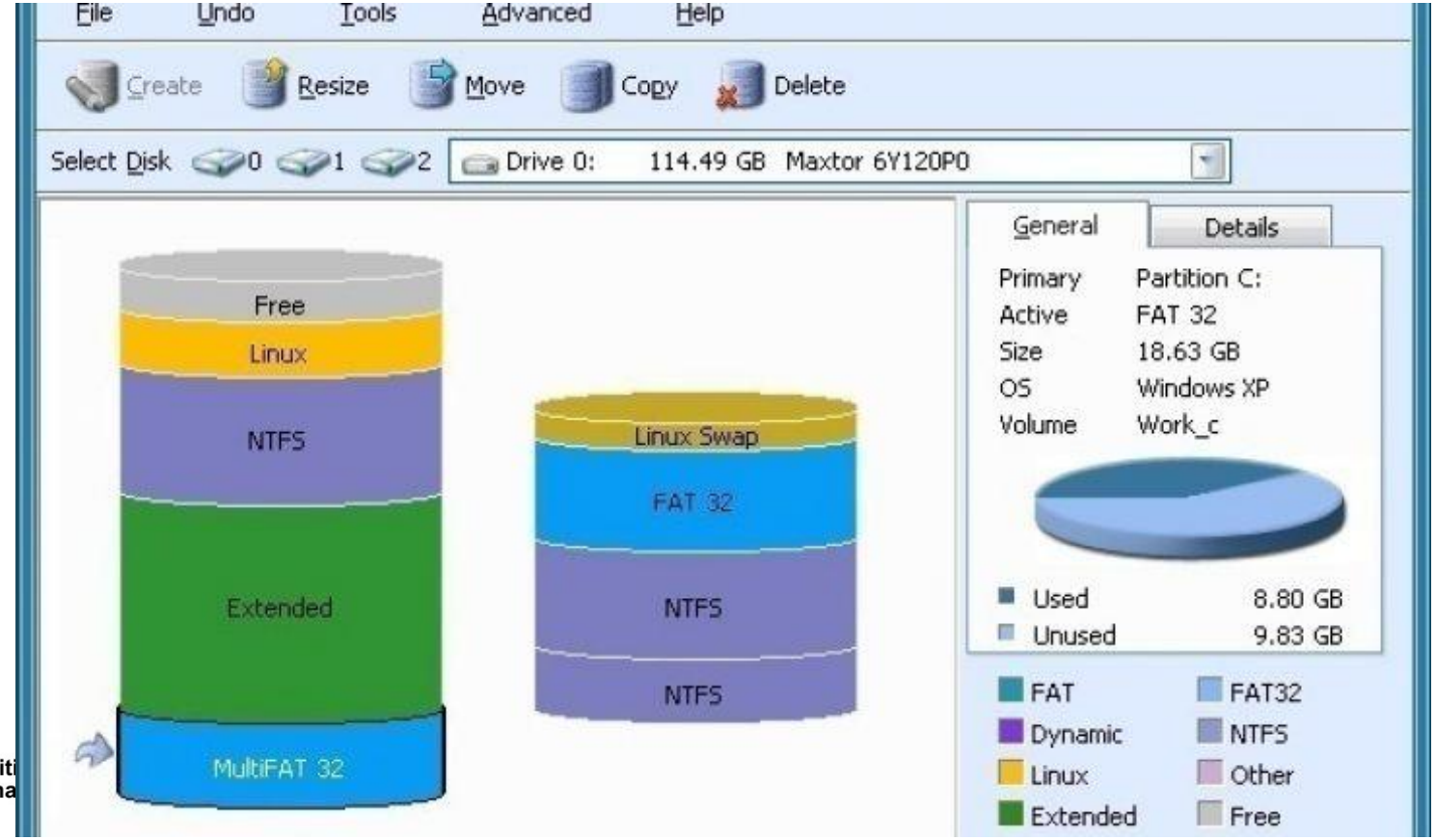
Measure of how much data can be moved at a time

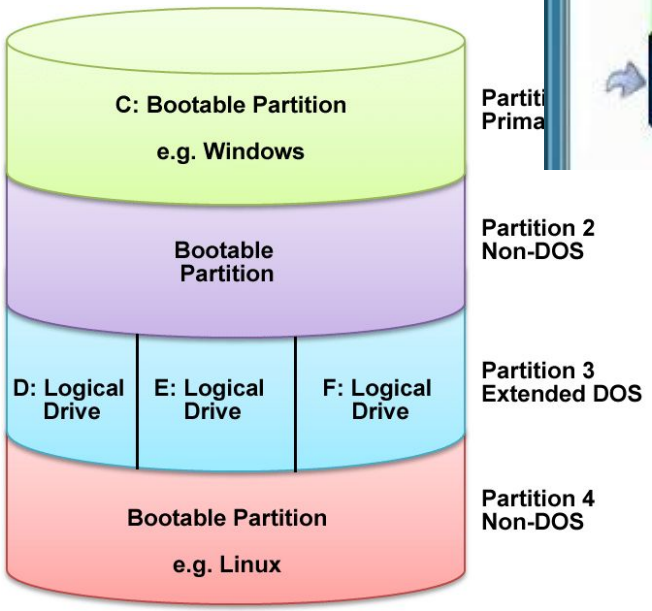
Binary vs. decimal data measurements

BINARY SYSTEM		
ME	FACTOR	VALUE IN BYTES
ibyte (KiB)	2^{10}	1,024
bibyte (MiB)	2^{20}	1,048,576
ibyte (GiB)	2^{30}	1,073,741,824
ibyte (TiB)	2^{40}	1,099,511,627,776
ibyte (PiB)	2^{50}	1,125,899,906,842,624
ibyte (EiB)	2^{60}	1,152,921,504,606,846,976
ibyte (ZiB)	2^{70}	1,180,591,620,717,411,303,424
ibyte (YiB)	2^{80}	1,208,925,819,614,629,174,706,176

DECIMAL SYSTEM		
NAME	FACTOR	VALUE IN BYTES
kilobyte (KB)	10^{3}	1,000
megabyte (MB)	10^{6}	1,000,000
gigabyte (GB)	10^{9}	1,000,000,000
terabyte (TB)	10^{12}	1,000,000,000,000
petabyte (PB)	10^{15}	1,000,000,000,000,000
exabyte (EB)	10^{18}	1,000,000,000,000,000,000
zettabyte (ZB)	10^{21}	1,000,000,000,000,000,000,000
yottabyte (YB)	10^{24}	1,000,000,000,000,000,000,000,000


C: Bootable Partition
eg - Windows
D: Logical Drive
E: Logical Drive
F: Logical Drive
Bootable Partition
eg - Linux
Bootable Partition
eg - OS/2
Partition #1: Primary DOS
Partition #2: Extended DOS
Partition #3: Non-DOS
Partition #4: Non-DOS


File
Undo
Tools
Advanced
Help
Create
Resize
Move
Copy
Delete
Select Disk
0
1
2
Drive 0:
114.49 GB
Maxtor 6Y120P0
Free
Linux
NTFS
Extended
MultiFAT 32
Linux Swap
FAT 32
NTFS
NTFS
General
Details
Primary
Partition C:
Active
FAT 32
Size
18.63 GB
OS
Windows XP
Volume
Work_c
Used
8.80 GB
Unused
9.83 GB
FAT
FAT32
Dynamic
NTFS
Linux
Other
Extended
Free


C: Bootable Partition
e.g. Windows
Bootable Partition
D: Logical Drive
E: Logical Drive
F: Logical Drive
Bootable Partition
e.g. Linux
Partition 2 Non-DOS
Partition 3 Extended DOS
Partition 4 Non-DOS

THANKS!

Any questions?

You can find me at:

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- paul@clarusway.com

EC2 Volumes

Let's get our hands dirty!

- Managing EBS Volumes on Console and Terminal

  - attaching
  - detaching
  - mounting
  - partition
  - resizing